

Transition between live and work

Industrial Infill

Development pattern workshop

Description

The Industrial Infill development pattern intensifies land use mix and population in existing underused industrial land, while at the same time preserving industrial activity - vital for the city's economic well being. To achieve a mix of industrial and residential uses, the workshop assumed a shift from heavy industrial to light industrial and business industrial activity. This pattern supports the 11 sustainability principles, particularly:

- Principle 2: *Create walkable environments;*
- Principle 6: *Mix land uses;*
- Principle 7: *Strategically direct and manage redevelopment opportunities within existing areas;* and,
- Principle 8: *Support compact development.*

Challenges

The workshop addressed three challenges:

- To accommodate 60 people/ha and 75 jobs/ha, which translates to 3,200 people and 4,000 jobs in an existing 52-ha industrial area. With a density of 135 jobs and people per hectare (60 people/ha plus 75 jobs/ha), would be within the threshold to support high capacity transit (150 people and jobs per hectare).
- To intensify and diversify land use by introducing residential, commercial, and open space in an existing low density, single use, industrial area.
- To create a walkable environment in a large-parcel industrial area while accommodating truck and other traffic required for by industrial-related uses.

Summary & conclusions

The Industrial Infill development pattern workshop illustrates that a variety of light industrial-related activities are compatible with residential and residential-related activities. Successful infill requires a sensitive integration between industrial and residential land uses, and a pedestrian friendly neighbourhood design that also accommodates different types of traffic, including truck traffic. The team proposed a series of design strategies to support successful infill including a transitional “flex zone”, a walkable street network suitable for different types of traffic, a set of multi-use open spaces for both residents and workers, and a green infrastructure strategy.

*Above:
The Industrial Infill pattern intensifies land use mix and population in existing underused industrial land, while at the same time preserving industrial activity. The workshop team closely examined the integration of industrial and residential uses and designed a “flex zone” to transition between work-oriented areas and residential-oriented areas.*

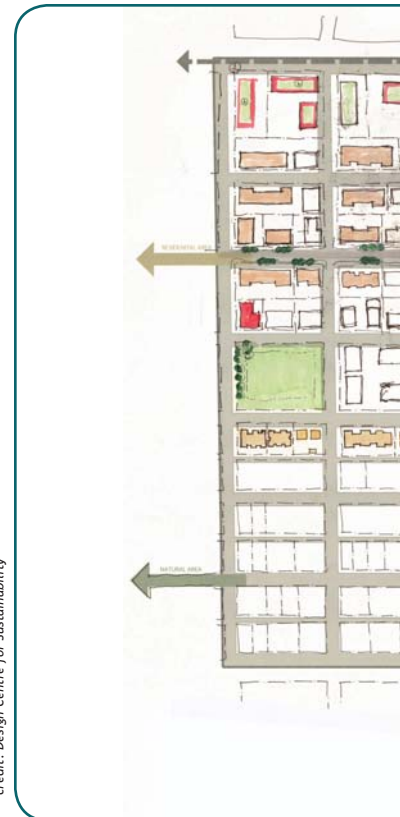
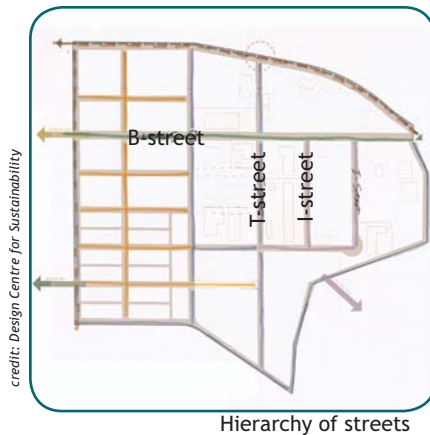
Industrial Infill

Design strategies

The workshop team explored diverse economic activities that were both suited to the existing low density industrial and compatible with an emerging residential community. The workshop team identified as a key issue the transition between *live* and *work* - between industrial and economic activity and residential activity. The team developed a series of strategies to: integrate residential and light-industrial uses; create a walkable street network that can accommodate different types of traffic, including trucks; design multi-use open spaces for both residents and workers; and, include green infrastructure practices.

1 Street network for both people and trucks

- Create a **hierarchy of pedestrian friendly and high mobility streets** that can accommodate different types of traffic: I-streets (industrial), T-streets (truck traffic), B- streets (“boots & bikes”), and local streets.
- Design the streets that need to **accommodate truck traffic** to be attractive and walkable, ensuring turning and visibility is comfortable for trucks.



5 Green infrastructure and low-impact development practices

- Create an **on-site stormwater management** system for each of the **larger parcels**.
- Support **functional landscaping** that integrates ecological functions into required landscape areas (e.g. dry ponds).
- Create a **palette of alternative stormwater management strategies** calibrated to a block/parcel scale. Allow landowners a choice of strategies toward achieving targeted performance standards.
- Use **green roofs and building forms** that permit **light penetration and natural ventilation** to manage stormwater and mitigate building heating and cooling requirements.

4 Open spaces

- Design lunch
- Create
- Design whole

2 Friendly transition between *live* and *work*

- Create a “**flex zone**” around a “high street” as a transition between industrial and residential uses and different geometries of smaller and larger block parcels (see cover illustration).
- Provide opportunities for **industrial-related activities** that are **compatible with residential and residential-related uses**.
- Allow for the evolving nature of work by encouraging architectural **innovation and design flexibility** at the block and parcel level. Design buildings to have to longer life span and different use configurations, and blocks and parcels that easily reconfigure for different uses.
- Use **built forms** that successfully **integrate residential and industrial activity** within one parcel and/or building (e.g. ‘loft-style’ buildings, 3 to 5 storey mid rises, buildings with loading spaces off a lane).

Live/Work	Live/Work Transition	Work (Industry-Focused)	
		light industry / warehousing & distribution	+ intrusive
		manufacturing	
	low-scale manufacturing	low-scale manufacturing	
retail commercial	retail commercial		
flex work space	flex work space		
mixed-use residential			- intrusive

Matrix of compatible uses and activities



Industrial Infill plan

Spaces for both residents and workers

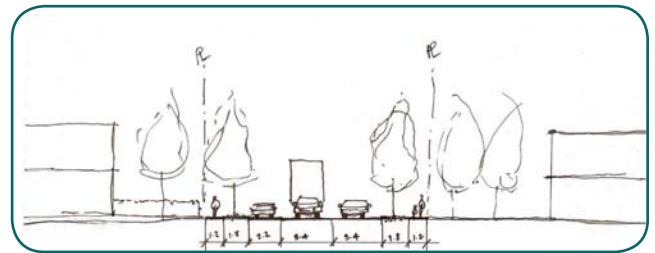
Use parks as **multi-use** places where workers can gather at the end of their shift and residents can gather in the afternoon and evening.

Create a **central gathering space** for the community.

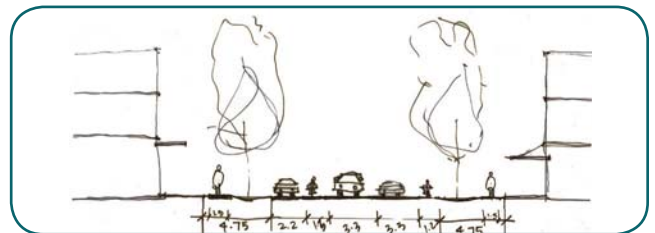
Use **public utility land** for use as an **amenity** for the benefit of the neighbourhood.

3 Walkability to goods and services

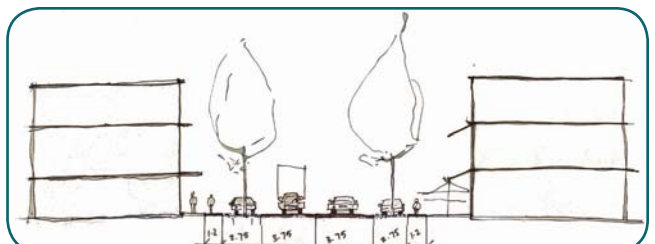
- Redesign the site as a **walkable neighbourhood** where goods and services are accessible within a 5 minute walk for all residents and employees.
- Orient **buildings to the street**.
- In **large blocks**, create connections to ensure these are **porous for pedestrians** (e.g. mid-block connections, semi public open spaces, etc.)



I-street (Industrial), 15m ROW



B-street (Boots and Bikes), 21m ROW

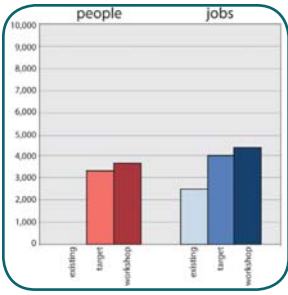


T-street (Truck traffic), 15m ROW

credit: Design Centre for Sustainability

Industrial Infill

Key questions & findings



Existing, target, and workshop population & jobs

How many people and jobs can an Industrial Infill hold?

The Industrial Infill pattern accommodates 3,600 new people (in 1,800 new dwelling units) and 1,900 new jobs in a 52-hectare infill site. This translates to a total population of 3,600 and 4,300 jobs, exceeding the population target by 13% and the employment target by 7%. Resulting densities are 70 people/ha and 80 jobs/ha.

What is the appropriate land use mix for an Industrial Infill?

The workshop team identified the need for flexibility to foster innovation and entrepreneurial growth in industrial-related uses and attract future job opportunities. The team recognized the following industrial / economic activities as compatible with residential and residential-related uses: knowledge-intensive enterprises; design studios; assembly and light-manufacturing; production-related retail; repair and service; inter-modal distribution; oil industry consultants; renewable energy technologies; IT server farms; education/institutional; post-production services; and, small-business incubators (**Design strategy 2**). The land use mix diversity index for the resulting Industrial Infill pattern is 0.70.

What is the physical appearance of an Industrial Infill?

Industrial Infill maintains large-parcel employment areas and integrates them into the emerging community. A hierarchy of interconnected pedestrian-friendly and high-mobility streets structure the neighbourhood (**Design strategy 1**). Buildings orient to the street (**Design strategy 3**). Enhanced pedestrian pathways (**Design strategy 3**) connect multi-use open spaces for both workers and residents (**Design strategy 4**). Landscaping is attractive and functional for stormwater retention (**Design strategy 5**). Flexible buildings, parcels, and blocks support innovation (**Design strategy 2**). The team identified 'loft-style' buildings, 3 to 5 storey mid rises, and buildings with lane-accessible loading spaces as built forms that can successfully integrate residential and industrial activity (**Design strategy 2**).

What is the green infrastructure within an Industrial Infill?

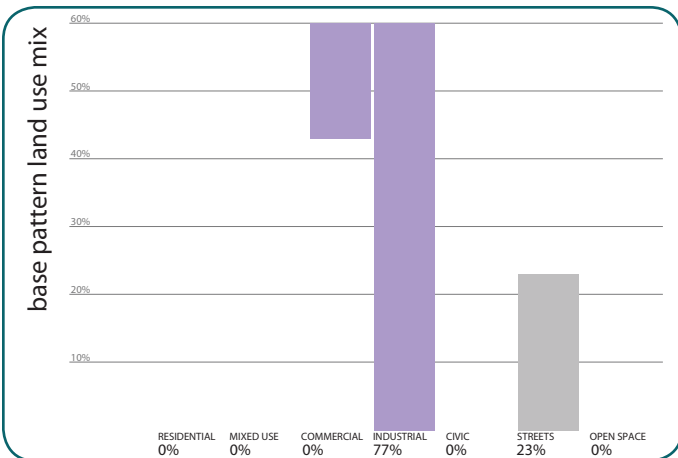
Industrial Infill can incorporate green infrastructure and low-impact development practices at the site and building scale through the following strategies: on-site stormwater management in each of the larger parcels; integrated ecological function into required landscape areas; a palette of strategies calibrated to a block/parcel scale; and, green roofs and building forms that permit light penetration and natural ventilation (**Design strategy 5**).

What is the phasing, replicability, and resiliency of an Industrial Infill?

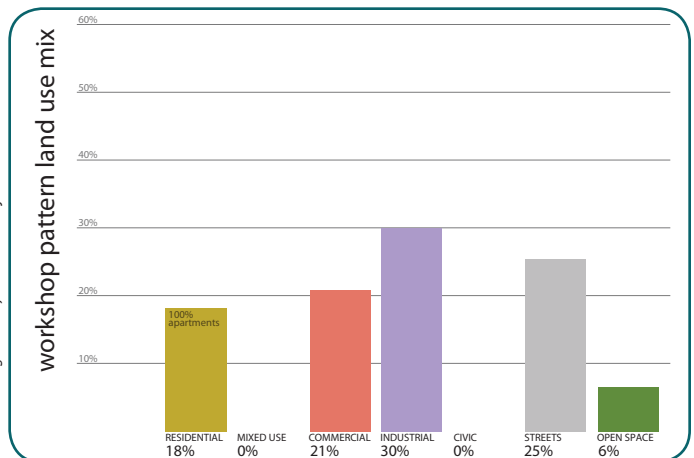
The workshop team proposed as necessary first steps: undertake key 'civic infrastructure' improvements (e.g. open spaces, transit, recreation uses); identify a "high street"; and, attract "work-centric" commercial uses. The team identified flexibility as key to replicability and resiliency. The pattern allows for area-specific land use mix, building typologies, and open spaces to adapt to local conditions found at different sites (**Design strategies 2 and 3**). Flexible blocks, parcels, and buildings built for a longer life span can reconfigure with the evolving nature of work. Flexible policy that allows for both small scale incremental change and comprehensive redevelopment of larger parcels is also key (**Design strategy 2**).

Above:
The workshop team accommodated 4300 new jobs and 3600 new people in the 52-ha industrial site, exceeding the targets by 7% in employment and 13% in population.

Below:
A more intensive and efficient use of the land allowed the team to introduce residential, commercial, and open space uses to the single use industrial site, maintain 30% of land for industrial uses, and meet the population and jobs targets. The resulting land use mix diversity index is 0.70.



Industrial Infill base land use mix



Industrial Infill workshop land use mix